

CLAIMS

1. Six-gear or seven-gear dual-clutch transmission (1, 30) comprising two clutches (K1, K2) the input sides of which are connected with one drive shaft (2) of a prime mover and the output side of which are connected with each one of two shafts (3, 4) disposed coaxially to each other, two countershafts (5, 6) upon which are rotatably supported gear wheels designed as idler wheels (7, 8, 9, 10, 15, 16, 17, 34, 35, 36), gear wheels non-rotatably situated upon said two input shafts (3, 4) and designed as fixed wheels (11, 12, 13, 14, 33, 37) which are in tooth contact with said idler wheels (7, 8, 9, 10, 15, 16, 17, 34, 35, 36), coupling devices (22, 23, 24, 25, 31, 32) non-rotatably and axially movably supported upon said two countershafts (5, 6) and movable by means of setting devices, and fastened respectively on said two countershafts (5, 6) output gear wheels (18, 19) which are in tooth contact with one toothing (20) on one differential transmission (21), characterized in that two fixed wheels (13, 14) are situated upon one input shaft (3) and at least one other fixed wheel (respectively 12 or 37) is situated upon the other input shaft (4) for respectively driving two idler wheels (8, 15 and 35, 36; 9, 16; 10, 17).

2. Six-gear or seven-gear dual-clutch transmission according to claim 1, characterized in that said two fixed wheels (13, 14) are fastened on said input shaft (3) designed as hollow shaft while at least one other fixed wheel (12) sits upon said second input shaft (4) designed as solid shaft.

3. Six-gear or seven-gear dual-clutch transmission according to claim 1 or 2, characterized in that said idler and fixed wheels of the highest gears (G6 or G7) and of the third highest gear (G4 or G5) can be driven by an input shaft other than that of said idler and fixed wheels of the second highest gear (G5 or G6) and of the fourth highest gear (G3 or G4).

4. Six-gear or seven-gear dual-clutch transmission according to any one of claims 1 to 3, characterized in that said idler wheels (16 or 36) of the highest gear (G6 or G7) and said idler wheels (15 or 16) of the second highest gear (G5 or G6) are situated upon said second countershaft (6) while said idler

gears (9 or 35) of the third highest gear (G4 or G5) and said idler wheels (8 or 9) of the fourth highest gear (G3 or G4) are supported on said first countershaft (5).

5. Six-gear or seven-gear dual-clutch transmission according to at least one of claims 1 to 4, characterized in that said idler wheel (17) for the second gear (G2) and said idler wheel (10) for the reverse gear (RG) are situated upon different countershafts (5, 6) and can be driven by a common fixed wheel (14).

6. Six-gear double-clutch transmission according to at least one of the preceding claims, characterized in that the gear wheels in the transmission, beginning from said two clutches (K1, K2) are disposed as follows: reverse gear (RG) and second gear (G2), fourth gear (G4) and sixth gear (G6), third gear (G3) and fifth gear (G5), the same as first gear (G1).

7. Six-gear double clutch transmission according to any one of claims 1 to 6, characterized in that said gear wheels in the transmission, beginning from said two clutches (IK1, 2), are disposed as follows: reverse gear (RG) and second gear (G2), fourth gear (G4) and sixth gear (G6), fifth gear (G5) and seventh gear (G7), the same as first gear (G1).

8. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that said countershafts (5, 6) are disposed paraxially or forming an angle with said two input shafts (3, 4).

9. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that the distances of both countershafts (6, 7) from the inner input shaft (4) designed as solid shaft and from the input shaft (3) designed as hollow shaft are different and that said output gear wheels (18, 19) upon said two countershafts (3, 4) form with the output toothings (20) upon said differential transmission (21) reduction ratios of different magnitude.

10. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims , characterized in that said output gear wheels (18, 19) are situated on the ends of said two countershafts (5, 6) pointing to said two clutches (K1, I2).

11. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that the gear wheels of the third

gear (G3) and of the fifth gear (G5) are different in the six-gear dual-clutch transmission (1) from those of the seven-gear dual-clutch transmission (30) which is otherwise to a great extent similarly built.

12. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that the linear gears or the non-linear gears are driven by said outer input shaft (3) designed as hollow shaft.

13. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that the fourth gear (G4) and the reverse gear (RG) with a common coupling device (23) can be non-rotatably connected alternatively with said first countershaft (5), the same as the second gear (G2) and the sixth gear (G6) with another common coupling device (25) alternatively with said second countershaft (6).

14. Six-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that the first gear (G1) and the third gear (G3) with a common coupling device (22) can be alternatively non-rotatably connected with said first countershaft (5) and the fifth gear (G5) with another coupling device (24) with said second countershaft (6).

15. Seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that the first gear (G1) and the fifth gear (G5) with a common coupling device (31) can be non-rotatably connected alternatively with said first countershaft (5), the same as the third gear (G3) and the seventh gear (G7) with another common coupling device (32) with said second countershaft (6).

16. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that said coupling devices (22, 23, 24, 25, 31, 32) are designed as positive fit dog clutches or as shifting sets.

17. Six-gear or seven-gear dual-clutch transmission according to claim 16, characterized in that each one of said shifting sets (22, 23, 24, 25, 31, 32) comprises one sliding sleeve axially movable upon the respective countershafts (5, 6) but non-rotatably connected therewith and synchronizer rings disposed to the right and/or left thereof.

18. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that said gear wheels (7, 17, 10) of the first gear (G1), of the second gear (G2) and/or the reverse gear (RG) are situated in the area of the front sides of the transmission housing.

19. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that said gear wheels (7, 17, 10) of the first gear (G1), of the second gear (G2) and/or the reverse gear (RG) are located in the central area of the transmission.

20. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that said first clutch (K1) situated closer in direction to the prime mover is provided as starting clutch for the first gear (G1).

21. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that said second clutch (K2) farther removed from the prime mover is provided as starting clutch for the reverse gear (RG).

22. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that said two clutches (K1, K2) are designed as powershift clutches, preferably as multi-disc clutches or as dry one-disc clutches.

23. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that said two clutches (K1, K2) are situated paraxially or coaxially with each other.

24. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that a separate starting element, preferably one hydrodynamic torque converter, is situated according to driving technique between said drive shaft (2) of the prime mover and the input side of said clutches (K1, K2).

25. Six-gear or seven-gear dual-clutch transmission according to claim 24, characterized in that the output sides of said two clutches (K1, K2) of said two

input shafts (3, 4) are non-rotatably interconnectable by means of a shifting device (38) for performing a starting operation.

26. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that a torsional vibration damper is situated between said clutches (K1, K2) and the drive shaft (2) of the prime mover.

27. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that said two countershafts (5, 6) and/or at least one of said two input shafts (3, 4) are connected with a non-wear brake (retarder).

28. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that on both countershafts (5, 6) and/or at least on one of said two input shafts (3, 4) at least one other gear wheel is situated for driving auxiliary units.

29. Six-gear or seven-gear dual-clutch transmission according to claim 28, characterized in that with said countershafts (5, 6) and/or at least one of said two input shafts (3, 4), at least one electric generator can be driven.

30. Six-gear or seven-gear dual-clutch transmission according to at least one of claims 1 to 28, characterized in that a generator can be driven from the input side of said clutches (K1, K2).

31. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that said differential transmission (21) is designed as power-divider differential transmission or as length-divider differential transmission.

32. Six-gear or seven-gear dual-clutch transmission according to at least one of the preceding claims, characterized in that the setting device for actuating said coupling devices can be actuated manually or with servo assistance.

33. Six-gear or seven-gear dual-clutch transmission according to claim 32, characterized in that said setting devices actuatable with servo assistance have piston-cylinder systems actuatable by a hydraulic or pneumatic pressure medium.